INDEX

A

A breeding population of the Western Pacific crab *Hemigrapsis sanguineus* (Crustacea: Decapoda: Grapsidae) established on the Atlantic coast of North America, 195
A dissection of the functions of PS integrins during *Drosophila* development, 507
A region of steady high calcium at the vegetal pole of *Medaka* eggs, 343
Acetylcholine, 484
Acid-base and ionic regulation, during and following emersion, in the freshwater bivalve, *Anodonta grandis simpsoniana* (Bivalvia: Unionidae), 289
Actin, 341
Aequorin, 325, 343
Agaricia, 104
Aggregation, 337
ALBRECHT, K., C. OSWALD, N. BROOKS, AND H. KRIDER, An analysis of *abnormal* cell oocyte, *daughterless-abo-like,* and *wavoid-like* in *Drosophila melanogaster:* related genes that affect oocytes and embryos, 509
ALLEN, P. G., J. M. BALTZ, AND D. A. BEGG, Ionic changes at fertilization alter the orientation of pigment granule saltations in *Arbacia* eggs, 509
ALLES, AJIT, see Harleen Singh, 513
Alloimmunity in the gorgonian coral *Swiftia exserta,* 127
Alpha$_2$-macroglobulin, 350
Amacrine cell, 327
An analysis of *abnormal* cell oocyte, *daughterless-abo-like,* and *wavoid-like* in *Drosophila melanogaster:* related genes that affect oocytes and embryos, 509
Anodonta, 175, 289
Antibody, 500
Aplysia, 81, 325, 333, 340, 484
Aplysia neurons, 331
Application of confocal laser scanning microscopy for spatial localization of actin, endoplasmic reticulum, and collagen mRNA in embryonic *Avian* corneel epithelia, 513
ARMSTRONG, PETER B., ATSUSHI IKAI, AND JAMES P. QUIGLEY, Protease-binding activity of *Limulus* α_2-macroglobulin, 350
ARNOLD, JOHN M., see Rui Wang, 348
Ascidian, 189
Asexual reproduction, 222
ASKEW, D., see D. Morrissey, 506
Asteriae, 95
ATEMA, JELLE, see Christy Karavanich, 359; and Paul A. Moore, 408
Atrial gland, 81
AUGUSTINE, GEORGE, see Peter Doroshenko, 320

B

Bacterial phylogeny, 135
BALTZ, J. M., see P. G. Allen, 509
BAPTA buffers, 345
BARBER, BRUCE J., SUSAN E. FORD, AND ROBERT N. WARGO, Genetic variation in the timing of gonadal maturation and spawning of the eastern oyster, *Crassostrea virginica* (Gmelin), 216
BARLOW, R. B., Jr., see E. D. Herzog, 321
Barnacles, 442
BECKER, SANDY, AND LAURA GRABEL, Localization of differentiation-specific mRNAs in differentiating F9 embryoid bodies, 509
BEGG, D. A., see P. G. Allen, 509
Behavior, 158, 402
BERNANDER, ÖJVIND, AND CHRISTOF KOCH, Synaptic background activity influences spatiotemporal integration of single pyramidal cells, 317
Beroë, 354, 355, 463
BFLP, 135
BIBB, HAROLD D., see Karen Montgomery, 511
BIGGER, CHARLES, see Luisa Salter-Cid, 127
Biochemical changes associated with reduction of cell motility and aggregation following sulfate restriction in the marine sponge *Microciona prolifera,* 337
Biological activity of biosynthetic rainbow trout growth hormone in the eastern oyster, *Crassostrea virginica,* 459
Biological transport, 312
Bioluminescence, 135, 181
Bioluminescence maintenance in juvenile *Porichthys notatus,* 181
Bipolar cells, 323
Bivalve, 289, 298, 459
BLACKMAN, RONALD K., see Michele Sanicola, 508
Blood cells, 189
Blue crab, 453
Body size, 261
BODZNICK, DAVID, see John Montgomery, 326
BÖTTCHER, KIRSTEN, see Dietrich Siebers, 312
BOYLE, RICHARD, AND STEPHEN M. HIGHSTEIN, Responses of horizontal semicircular canal afferents to rotary and mechanical stimulation, 319
Brachyuran crab, 195
BROOKS, N., see K. Albrecht, 509
BROWN, ALICE F., Outbreeding depression as a cost of dispersal in the harpacticoid copepod, *Tigriopus californicus,* 123
Brown tide, 298
Browne (Harvey), Ethel, 72
BUCKLIN, ANN, AND LISA KANN, Mitochondrial DNA variation of copepods: markers of species identity and population differentiation in *Calanus,* 357
BULLIS, ROBERT A., see Bryan Cherry, 358
BURGER, MAX M., see William J. Kuhns, 337
BYRNE, ROGER A., AND BRIAN R. MCMAHON, Acid-base and ionic regulation, during and following emersion, in the freshwater bivalve, *Anodonta grandis simpsoniana* (Bivalvia: Unionidae), 289

C

Ca^{++}, 349
Ca uptake, 347
Calcium, 325, 331, 342, 343, 345, 348, 353
Calcium buffer injections block cytokinesis in *Xenopus* eggs, 345
Calcium in development, 342
Calcium waves accompany contraction waves in the *Oryzias latipes* (*Medaka*) blastoderm, 353
Calliobothrium verticillatum, 358
Cancer productus, 363
Carcinus maenas, 312
Cardioregulation, 353

Cardioregulatory peptides in *Limulus:* effects of F1, F2, and an endogenous FMRFamide-like peptide on the neurogenic heart, 353
CASE, JAMES F., see Allen F. Mensinger, 181
CCK, 484
Cell motility and development in wild-type and mutant *Dictyostelium* cells, 510
CERRATO, ROBERT M., HEATHER V. E. WALLACE, AND KENT G. LIGHTFOOT, Tidal and seasonal patterns in the chondrophore of the soft-shell clam *Mya arenaria,* 307
CHANG, ERNEST S., see Jin-Hua Cheng, 169
CHAPPELL, RICHARD L., see Robert Paul Malchow, 323; and Etha Schlemermeyer, 327
CHARLTON, MILTON P., see Sally Schroeter, 328
Chelate limb, 158
Chemical
  detection, 419
  noise, 419
  signal, 359, 419
Chemical signal-to-noise detection by spiny lobsters, 419
Chemoreception, 205, 408, 419
CHEN, THOMAS T., see Kennedy T. Paynter, 459
CHENG, JIN-HAU, AND ERNEST S. CHANG, Ecdysteroid treatment delays ecdysis in the lobster, *Homarus americanus,* 169
CHERRY, BRYAN, ALLISON S. NEESE, ROBERT A. BULLIS, AND GERHARD A. SCHAD, Investigations into the life cycle of *Calliobothrium verticillatum,* a tapeworm of *Mustelus canis,* 358
CHIA, FU-SHIANG, see Don R. Levitan, 371
Chondrophore, 307
CHONG, MARIA D., see Sherry D. Painter, 81
Cilia, 339
Ciliates, 500
Circadian rhythms, 321, 340
CISHEK, DAWN M., RICHARD H. SANGER, AND LIONEL F. JAFFE, Towards the development of a technique for introducing aequorin into amoebae of *Dictyostelium discoideum* via electroporation, 342
Cloning of the chicken homologs of the human homeobox-containing genes Hox-4F and 11 and analysis of their expression during chick limb development, 512
Coelenterate, 127
COELHO, CAROLINE N. D., see Blanka Rogina, 512
COELHO, CAROLINE N. D., WILLIAM B. UPHOLT, AND ROBERT A. KOSHER, Gap junctional communication and homeobox genes in the regulation of pattern formation during chick limb development, 510
Coenenchyme, 275
Coexistence of hydroid eating nudibranchs: do feeding biology and habitat use matter? 248
Comparative immunity, 127
Complex systems, 484
CONDEELIS, JOHN, see David Knecht, 510
Construction of preimplantation mouse on cDNA library by polymerase chain reaction, 514
COPELAND, D. EUGENE, Fine structure of photophores in *Gonostoma elongatum:* detail of a dual gland complex, 144
Copepod, 123, 269, 357
Coral, 104
Coral reef fish, 199
CORMIER, JEFFRY, see Sherry D. Painter, 81
Courtship, 402
COWAN, DIANE F., The role of olfaction in courtship behavior of the American lobster, *Homarus americanus,* 402
COX, DIANE, see David Knecht, 510
COX, RACHEL L., DAVID L. GLICK, AND FELIX STRUMWASSER, Isolation and protein sequence identificiation of *Aplysia californica* lens crystallins, 333
Crab, 312
Crab reproductive rhythms, 387
CRAIN, RICHARD C., LYNNE M. QUARMBY, AND YIR G. YUEH, Inositol phospholipid metabolism is involved in deflagellation of *Chlamydomonas reinhardtii,* 507
Crassostrea virginica, 216
Crepidula veliger, 335
Crumpling behavior, 474
Crustacea, 158, 205, 402, 419
Crustacean reproduction, 387
CURTO, MARCELLO, see Harleen Singh, 513
Cyclic nucleotide-mediated modulation of the pyloric motor pattern in the stomatogastric ganglion of the crab *Cancer borealis,* 329
Cytokinesis, 345
Cytomechanics of growth cone-target interactions in *Aplysia* bag cell neurons, The, 511

D

DANILCHIK, M. V., see R. M. Savage, 513
DC and AC field effects on early sea urchin development, 511
Defensive behavior, 363
DEINER, MICHAEL, AND SIDNEY TAMM, Mechanisms of paddle cilia formation in molluscan veligers, 335
Density dependence, 261
Developmental stage and contractile activity regulate expression of CAT transgene in skeletal muscle *in vitro,* 512
Diadema antillarum, 261
Dictyostelium, 342
DIETZ, T. H., see D. B. Gardiner, 175
Differences in free calcium concentration between oocytes and nurse cells revealed by corrected aequorin luminescence, 349
Differential sensitivity, 419
Dioptric tissues, 144
Dispersal, 123
Dissection of ectopic function of the paired segmentation gene in *Drosophila* embryos, 506
Distance chemoreception, 363
Distribution of synaptic specialization in the frog cardiac ganglion, 328
DOLAN, LIAM, AND R. SCOTT POETHIG, Non cell-autonomous control of leaf morphogenesis in cotton (*Gossypium barbadense*), 506
Dominance, 359
Dormancy, 269
DOROSHENKO, PETER, STEPHEN HESS, AND GEORGE AUGUSTINE, Inhibitory effects of nonhydrolyzable guanine nucleotides on neurotransmitter release at the squid giant synapse, 320

E

Ecdysteroid treatment delays ecdysis in the lobster, *Homarus americanus,* 169
Echinodermata, 371
Echinoid, 261
ECKER, J., see J. Kieber, 507
Effect of gravity on cytoplasmic streaming in characean cells, The, 508
Effect of hydrogen peroxide on preventing or contributing to polyspermic fertilization in sea urchin: modification by tamoxifen and macroglobulin, 346
Effects of indomethacin on active ion transport across the gills of the shore crab, *Carcinus maenas,* 312
Effects of vitamin E and OH-TEMPO (Spin Label Trap) on UV-induced dogfish (*Mustelus canis*) lens opacification relative to cytoskeletal actin, 341
Elasmobranch, 326
Electron microscopy, 144, 158
Electroporation, 342
Electrosense, 326
Emersion, 289
Enzymatic characterization of the morphogen recognized by *Agaricia humilis* (scleractinian coral) larvae, 104
Enzyme, 104
Epithelial adhesion, 463
ERG, 321
ERNST, SUSAN G., see Michael Levin, 511; and Margaret Soltysik-Española, 513
Ethel Browne, Hans Speman, and the discovery of the Organizer Phenomenon, 72

Evaluation of spermatocidal activity of water soluble gossypol on the sperms of *Arabacia punctulata* and *Spisula solidissima,* 347
External fertilization, 232

F

Feeding, 248, 419
FELDER, DARRYL L., see Todd L. Zimmerman, 387
Fertilization, 232, 336, 348
Fertilization success, 261, 371
Fine structure of photophores in *Gonostoma elongatum:* detail of a dual gland complex, 144
Fish, 232
Flagella, 339
FLUCK, RICHARD A., ANDREW L. MILLER, AND LIONEL F. JAFFE, Calcium waves accompany contraction waves in the *Oryzias latipes* (*Medaka*) blastoderm, 353
FLUCK, RICHARD A., see Lionel F. Jaffe, 343; and Jane A. McLaughlin, 345
Fluorescence, 348
FMRFamide, 484
FMRFamide-like peptides, 353
FORD, SUSAN E., see Bruce J. Barber, 216
FORSCHER, PAUL, see Chi-Hung Lin, 511
FRENKEL, KRYSTYNA, see Margalit Rosenkranz, 346
FREYD, GWEN, AND H. ROBERT HORVITZ, Neuronal and cell-lineage expression patterns of the *C. elegans* cell lineage gene lin-11, 508
Function of surface sclerites in gorgonians (Coelenterata, Octocorallia), The, 275

G

GABA, 484, 510
GABA function in locomotion and expulsion in *C. elegans,* 510
GAINEY, LOUIS F., JR., AND SANDRA E. SHUMWAY, The physiological effect of *Aureococcus anophagefferens* ("brown tide") on the lateral cilia of bivalve mollusks, 298
Gamete kinetics, 371
Gap junctional communication and homeobox genes in the regulation of pattern formation during chick limb development, 510
GARDINER, D. B., F. S. TURNER, J. M. MYERS, T. H. DIETZ, AND H. SILVERMAN, Long-term culture of freshwater mussel gill strips: use of serotonin to affect aseptic conditions, 175
Gargonacea, 275
Gastropod ecology, 363
GELBART, W. M., see Michele Sanicola, 508; and Kristi Wharton, 508
Genetic analysis of hormone regulated seedling development in *Arabidopsis thaliana,* 507
Genetic variation in the timing of gonadal maturation and spawning of the eastern oyster, *Crassostrea virginica* (Gmelin), 216
Germ plasm dynamics in *Xenopus* early development, 513
Gill, 312
Gill culture, 175
Gill musculature, 175
GLICK, DAVID L., see Rachel L. Cox, 333
Glycosaminoglycan, 104
Gonadal development, 216
GONZÁLEZ, JORGE, see Michael Levin, 511
Gossypol, 347
GOVIND, C. K., see A. T. Read, 158
GRABEL, L. B., see M. E. Lenburg, 506; Sandy Becker, 509; and Patricia A. Labosky, 511
GRAY, ANN, see Sherry D. Painter, 81
GREAVES, JOHN, see Charlotte P. Mangum, 453
GRINBLAT, YEVGENYA, see Susan B. Zusman, 507
GROOME, JAMES R., Cardioregulatory peptides in *Limulus:* effects of F1, F2, and an endogenous FMRFamide-like peptide on the neurogenic heart, 353
Growth, 379, 459
Growth hormone, 459
Growth, rank, and maturation of the freshwater prawn, *Macrobrachium rosenbergii;* analysis of marked prawns in an experimental population, 379
GTP-binding proteins, 320
GUZMAN, P., see J. Kieber, 507
Gynogenesis, 222

H

HANEJI, TATSUJI, see Hiroshi Ueno, 347
HAUSMAN, R. E., see G. D. Vivek Sagar, 512; and A. S. M. Krishna Rao, 512
HAYGOOD, MARGO G., see Connie J. Wolfe, 135
Hemigrapsis sanguineus, 195
Hemocyanin, 453
Hermaphroditism, 199
Hermit crab, 238
HERZOG, E. D., AND R. B. BARLOW, JR., Ultraviolet light from the nighttime sky enhances retinal sensitivity of *Limulus,* 321
HESS, STEPHEN, see Peter Doroshenko, 320
High-resolution, 4-dimensional imaging of early development in *Lytechinus variegatus,* 336
HIGHSTEIN, STEPHEN M., see Richard Boyle, 319
Histamine, 484
Histocompatibility, 127
History of science (biology), 72
Homarus americanus, 402
Horizontal canal, 319
Horseshoe crab, 353
HORVITZ, H. ROBERT, see Gwen Freyd, 508; and Erik Jorgensen, 510
How *Beroë* keeps its mouth shut, or its lips are sealed, 354
HULATA, G., see Z. Ra'anan, 379
Hyalophora cecropia, 349
Hyara, 72
Hydrodynamics, 442
Hydrogen peroxide, 346
Hydroid, 248
Hydromedusa, 474
Hydrozoa, 474
HYNES, RICHARD O., see Susan B. Zusman, 507

I

Identification in *Drosophila* of a new member of the TGF-β superfamily of cell signalling molecules, 508
Identification of a cDNA encoding the cell recognition molecule, retina cognin, 512
IKAI, ATSUSHI, see Peter B. Armstrong, 350
IKEGAMI, SUSUMU, TOMOKO MITSUNO, MASANORI KATAIKA, SATOSHI YAJIMA, AND MIÉKO KOMATSU, Immunological survey of planktonic embryos and larvae of the starfish, *Asterina pectinifera,* obtained from the sea, using a monoclonal antibody directed against egg polypeptides, 95
Imaging free calcium in cultured *Aplysia* bag cell neurons, 325
Imaging preterminal calcium concentration microdomains in the squid giant synapse, 316
Immunochemistry, 500
Immunodetection, 95
Immunohistochemistry of diverging and converging neurotransmitter systems in mollusks, 484
Immunological survey of planktonic embryos and larvae of the starfish, *Asterina pectinifera,* obtained from the sea, using a monoclonal antibody directed against egg polypeptides, 95
Inbreeding depression, 123
Indomethacin, 312
Inducer, 104
Influence of body size and population density on fertilization success and reproductive output in a free-spawning invertebrate, 261
Inhibitory effects of nonhydrolyzable guanine nucleotides on neurotransmitter release at the squid giant synapse, 320

Inositol phospholipid metabolism is involved in deflagellation of *Chlamydomonas reinhardtii,* 507
INOUÉ, SHINYA, ANDREAS STEMMER, THEODORE INOUÉ, AND ROBERT A. KNUDSON, High-resolution, 4-dimensional imaging of early development in *Lytechinus variegatus,* 336
INOUÉ, THEODORE, see Shinya Inoué, 336
Input resistance, 317
Integrin phosphorylation and focal contact assembly in dihydrocytochalasin B treated differentiating F9 cells, 506
Intracellular dyes, 332
Introduced marine species, 195
Invertebrate immunity, 350
Invertebrate tissue culture, 175
Investigations into the life cycle of *Calliobothrium verticillatum,* a tapeworm of *Mustelus canis,* 358
Ion regulation, 289
Ionic changes at fertilization alter the orientation of pigment granule saltations in *Arbacia* eggs, 509
Iridocyte (iridosome), 144
Isolation and protein sequence identification of *Aplysia californica* lens crystallins, 333

J

JAFFE, LIONEL F., ANDREW L. MILLER, AND RICHARD A. FLUCK, A region of steady high calcium at the vegetal pole of *Medaka* eggs, 343
JAFFE, LIONEL F., see Andrew L. Miller, 325; Dawn M. Chisek, 342; Jane A. McLaughlin, 345; Richard I. Woodruff, 349; Richard A. Fluck, 352; and Rui Wang, 348
JANJIC, OLIVERA, see Johanna L. Phillips, 512
Jellyfish, 474
JORGENSEN, ERIK, STEVE MCINTIRE, AND H. ROBERT HORVITZ, GABA function in locomotion and expulsion in *C. elegans,* 510

K

KAFATOS, FOTIS, see Susan B. Zusman, 507
KANAMORI, KAN, see Hitoshi Michibata, 189
KANN, LISA, see Ann Bucklin, 357
KARAVANICH, CHRISTY, AND JELLE ATEMA, Role of olfaction in recognition of dominance in the American lobster (*Homarus americanus*), 359
KARPLUS, I., see Z. Ra'anan, 379
Karyology, 222
KATAOKA, MASANORI, see Susumu Ikegami, 95
KAUPP, SANDOR E., see Mark D. Ohman, 500
KCl-induced calcium rise in squid eggs: measurement of fura-2 fluorescence, 348
KERN, HEDI, see David Knecht, 510
KIEBER, J., P. GUZMAN, G. ROMAN, A. WOLLENBERG, AND J. ECKER, Genetic analysis of hormone regulated seedling development in *Arabidopsis thaliana,* 507
Kinetics of fertilization in the sea urchin *Strongylocentrotus franciscanus:* interaction of gamete dilution, age, and contact time, 371
KNECHT, DAVID, HEDI KERN, DIANE COX, JOHN CONDEELIS, DEB WESSELS, AND DAVID SOLL, Cell motility and development in wild-type and mutant *Dictyostelium* cells, 510
KNUDSON, ROBERT A., see Shinya Inoué, 336
KOCH, CHRISTOF, see Öjvind Bernander, 317
KOIDE, SAMUEL S., see Hiroshi Ueno, 347
KOMATSU, MIÉKO, see Susumu Ikegami, 95
KOSHER, ROBERT A., see Caroline N. D. Coelho, 510; and Blanka Rogina, 512
KRIDER, H., see K. Albrecht, 509
KUHNS, WILLIAM J., MAX M. BURGER, AND GRADIMIR MISEVIC, Biochemical changes associated with reduction of cell motility and aggregation following sulfate restriction in the marine sponge *Microciona prolifera,* 337
KUMARI, S. SINDHU, see Jack J. O'Brien, 427
KURIS, A., see Z. Ra'anan, 379

L

LABARBARA, MICHAEL, see Julie Pullen, 442
LABOSKY, PATRICIA A., MICHAEL P. WEIR, AND LAURA B. GRABEL, The use of PCR to identify novel mouse homeobox regions expressed during F9 embryoid body formation, 511
LAMBERT, WALTER J., Coexistence of hydroid eating nudibranchs: do feeding biology and habitat use matter? 248
LANDOWNE, DAVID, Change in optical activity associated with impulses in squid fin nerves, 322
Langmuir circulation, 360
Larvae, 104, 205
Lateral cilia, 298
Leapfrog, 379
Lectin, 104
LENBURG, M. E., AND L. B. GRABEL, Integrin phosphorylation and focal contact assembly in dihydrocytochalasin B treated differentiating F9 cells, 506
LENHOFF, HOWARD M., Ethel Browne, Hans Speman, and the discovery of the Organizer Phenomenon, 72
Lens, 333
Lens epithelium, 341
LEOPOLD, A. CARL, see Randy Wayne, 508
LEVIN, MICHAEL, JORGE L. GONZÁLEZ, AND SUSAN G. ERNST, DC and AC field effects on early sea urchin development, 511
LEVITAN, DON R., Influence of body size and population density on fertilization success and reproductive output in a free-spawning invertebrate, 261
LEVITAN, DON R., MARY A. SEWELL, AND FU-SHIANG CHIA, Kinetics of fertilization in the sea urchin *Strongylocentrotus franciscanus:* interaction of gamete dilution, age, and contact time, 371
LEWIS, J. C., AND E. VON WALLIS, The function of surface sclerites in gorgonians (Coelenterata, Octocorallia), 275
LIGHTFOOT, KENT G., see Robert M. Cerrato, 307
LIGUMIA, 175
LIM, JONG S., see Margalit Rosenkranz, 346
LIN, SHI-HUNG, AND PAUL FORSCHER, The cytomechanics of growth cone-target interactions in *Aplysia* bag cell neurons, 511
LLINÁS, R., M. SUGIMORI, AND ROBERT B. SILVER, Imaging preterminal calcium concentration microdomains in the squid giant synapse, 316
Lobster, 402, 419
Localization of differentiation-specific mRNAs in differentiating F9 embryoid bodies, 509
Long-term monitoring of Ca^+ in cultured *Aplysia* neurons with fluorescent probes, 331
Luciferin, 181
Luminescent organs, 144

M

Macrobrachium rosenbergii, 379
Macrociliary tooth patterns in beroid ctenophores, 355
Macrogloblin, 346
MALCHOW, ROBERT PAUL, RICHARD L. CHAPPELL, AND HARRIS RIPPS, Voltage- and ligand-gated conductances of bipolar cells from the skate retina, 323
MANGUM, CHARLOTTE P., JOHN GREAVES, AND JULIA S. RAINER, Oligomer composition and oxygen binding of the hemocyanin of the blue crab *Callinectes sapidus,* 453
MARCUS, NANCY H., Planktonic copepods in a sub-tropical estuary; seasonal patterns in the abundance of adults, copepodites, nauplii, and eggs in the sea bed, 269
MARKO, PETER B., AND A. RICHARD PALMER, Responses of a rocky shore gastropod to the effluents of predatory and non-predatory crabs: avoidance and attraction, 363
Maturation, 379
MCDERMOTT, JOHN J., A breeding population of the Western Pacific crab *Hemigrapsis sanguineus* (Crustacea: Decapoda: Grapsidae) established on the Atlantic coast of North America, 195
MCINTIRE, STEVE, see Erik Jorgensen, 510

McIntyre, Joseph, see Felix Strumwasser, 331
McIsaac, Robert, see Margaret Soltysik-Española, 513
McLaughlin, Jane A., Andrew L. Miller, Richard A. Fluck, and Lionel F. Jaffe, Calcium buffer injections block cytokinesis in *Xenopus* eggs, 345
McMahon, Brian R., see Roger A. Byrne, 289
McNamara, John C., see Eliana Scemes, 474
McTeague, J. A., see A. T. Read, 158
Mechanisms of paddle cilia formation in molluscan veligers, 335
Mensinger, Allen F., and James F. Case, Bioluminescence maintenance in juvenile *Porichthys notatus,* 181
Mesopelagic fish, 144
Metabolism, 459
Metamorphosis, 104
Michibata, Hitoshi, Akemi Morita, and Kan Kanamori, Vanadobin, a vanadium-binding substance, extracted from the blood cells of an ascidian, can reduce vanadate (V) to vanadyl (IV), 189
Microgrowth patterns, 307
Midshipman fish, 181
Miller, Andrew L., Peter J. S. Smith, Carol A. Rainville, Osamu Shimomura, Felix Strumwasser, and Lionel F. Jaffe, Imaging free calcium in cultured *Aplysia* bag cell neurons, 325
Miller, Andrew L., see Jane A. McLaughlin, 345, Richard I. Woodruff, 349, Richard L. Fluck, 352, Rui Wang, 348, and Lionel F. Jaffe, 343
Misevic, Gradimir, see William J. Kuhns, 337
Mitochondrial DNA variation of copepods: markers of species identity and population differentiation in *Calanus,* 357
Mitosis, 336
Mitsuno, Tomoko, see Susumu Ikegami, 95
Mixed layer, 360
Modes of feeding in aggregations of barnacles and the shape of aggregations, 442
Modulation of programmed cell death and gene expression in mouse limb development, 513
Molluscan tissue culture, 175
Mollusk, 81, 222
Monoclonal antibody, 95
Monomeric subunit composition, 453
Montgomery, John, and David Bodznick, Properties of medullary interneurons of the skate electrosense provide evidence for the neural circuitry mediating ventilatory noise suppression, 326
Montgomery, Karen, and Harold D. Bibb, Distribution within dorsal root ganglia of horseradish peroxidase transported from the hindlimb bud of *Rana pipiens,* 511
Moore, Paul A., and Jelle Atema, Spatial information in the three-dimensional fine structure of an aquatic odor plume, 408
Moran, Denis, Voltage-dependent -L-type Ca^{2+} channels VDCCs participate in regulating neural crest development, 506
Morita, Akemi, see Hitoshi Michibata, 189
Morphogen, 104
Morphology and behavior of an unusually flexible thoracic limb in the snapping shrimp, *Alpheus heterochelis,* 158
Morrissey, D., D. Askew, L. Raj, and M. Weir, Dissection of ectopic function of the paired segmentation gene in *Drosophila* embryos, 506
Morse, Aileen N. C., see Daniel E. Morse, 104
Morse, Daniel E., and Aileen N. C. Morse, Enzymatic characterization of the morphogen recognized by *Agaricia humilis* (scleractinian coral) larvae, 104
Motility, 337
Mouth, 354
Mouth closure, 463
Mpitsos, George J., see Seppo Soinila, 484
Mustafa, Tarig, see Dietrich Siebers, 312
Mustelus canis, cestode parasite of, 358
Mya arenaria, 307
Myers, T. H., see D. B. Gardiner, 175

N

Nagle, Gregg T., see Sherry D. Painter, 81
Neese, Allison S., see Bryan Cherry, 358
Neural networks, 329
Neuromodulator, 329
Neuromuscular junctions, 474
Neuronal and cell-lineage expression patterns of the *C. elegans* cell lineage gene lin-11, 508
Neuronal growth, 331
Neurotransmitters, 484
New Jersey, 195
Nocente-McGrath, Catherine, see Margaret Soltysik-Española, 513
Noise suppression, 326
Non cell-autonomous control of leaf morphogenesis in cotton (*Gossypium barbadense*), 506
Northern anchovy larvae, 500
Nudibranch, 248
Nusbaum, Michael P., see Nelson Sprutson, 329

O

O'Brien, Jack J., S. Sindhu Kumari, and Dorothy M. Skinner, Proteins of crustacean exoskeletons: I. Similarities and differences among proteins of the four exoskeletal layers of four brachyurans, 427
O'Brien, M. M., Al Plueddemann, and R. A. Weller, The response of oceanic mixed layer depth to physical forcing: modelled vs. observed, 360
O'Foighil, Diarmaid, and Catherine Thiriot-Quiévreux, Ploidy and pronuclear interaction in northeastern Pacific *Lasaea* clones (Mollusca: Bivalvia), 222
Ocelli, 321
Octocorallia, 275
Odor plumes, 408
Ohman, Mark D., Gail H. Theilacker, and Sandor E. Kaupp, Immunochemical detection of predation on ciliate protists by larvae of the northern anchovy (*Engraulis mordax*), 500
Olfaction, 359, 402
Oligomer composition and oxygen binding of the hemocyanin of the blue crab *Callinectes sapidus,* 453
Ontogeny *versus* phylogeny in determining patterns of chemoreception: initial studies with fiddler crabs, 205
Optical recording of membrane potential changes from single neurons using intracellular voltage-sensitive dyes, 332
Organizer, 72
Orientation, 408
Ostracod, 181
Oswald, C., see K. Albrecht, 509
Outbreeding depression as a cost of dispersal in the harpacticoid copepod, *Tigriopus californicus,* 123
Ovarian follicle, 349
Oxygen binding, 453
Oysters, 216, 459

P

Paddle cilia, formation of, 335
Paguroidea, 238
Painter, Sherry D., Maria G. Chong, Mary A. Wong, Ann Gray, Jeffry G. Cormier, and Gregg T. Nagle, Relative contributions of the egg layer and egg cordon to pheromonal attraction and the induction of mating and egg-laying behavior in *Aplysia,* 71
Palmer, A. Richard, see Peter B. Marko, 363
Panulirus, 419
Paynter, Kennedy T., and Thomas T. Chen, Biological activity of biosynthetic rainbow trout growth hormone in the eastern oyster, *Crassostrea virginica,* 459
Peifer, M., E. Wieschaus, B. Riggleman, and C. Rauskolb, The role of *Drosophila* gene *armadillo* in cell interactions and *wingless* signaling, 507
Peterson, Christopher W., Variation in fertilization rate in the tropical reef fish, *Halichoeres bivattatus:* correlates and implications, 232
Pheromones, 81, 402

PHILLIPS, JOHANNA L., OLIVERA JANJIC, AND JEANNE A. POWELL, Developmental stage and contractile activity regulate expression of CAT transgene in skeletal muscle *in vitro,* 512
Photophores, 144
Physical forcing, 360
Physiological effect of *Aureococcus anophagefferens* ("brown tide") on the lateral cilia of bivalve mollusks, The, 298
Plankton, 95
Planktonic copepods in a sub-tropical estuary; seasonal patterns in the abundance of adults, copepodites, nauplii, and eggs in the sea bed, 269
Pleurobranchaea californica, 484
Ploidy and pronuclear interaction in northeastern Pacific *Lasaea* clones (Mollusca: Bivalvia), 222
PLUEDDEMANN, AL, see M. M. O'Brien, 360
POETHIG, R. SCOTT, see Liam Dolan, 506
Polysaccharide, 104
Polyspermic fertilization, 346
Population genetics, 357
Porichthys notatus, 181
POWELL, JEANNE A., see Johanna L. Phillips, 512
Prawn, 379
Predator avoidance, 363
Prey-predation interactions, 500
PRIOR, G., see R. E. Stephens, 339
Properties of medullary interneurons of the skate electrosense provide evidence for the neural circuitry mediating ventilatory noise suppression, 326
Protease inhibitor, 350
Protease-binding activity of *Limulus* α2-macroglobulin, 350
Protein sequence, 333
Proteins, 340, 427
Proteins of crustacean exoskeletons: I. Similarities and differences among proteins of the four exoskeletal layers of four brachyurans, 427
Protogyuy, 199
PULLEN, JULIE, AND MICHAEL LABARBARA, Modes of feeding in aggregations of barnacles and the shape of aggregations, 442
Pyramidal cells, 317

Q

QUARMBY, LYNNE M., see Richard C. Crain, 507
QUIGLEY, JAMES P., see Peter B. Armstrong, 350

R

RA'ANAN, Z., A. SAGI, Y. WAX, I. KARPLUS, G. HULATA, AND A. KURIS, Growth, rank, and maturation of the freshwater prawn, *Macrobrachium rosenbergii;* analysis of marked prawns in an experimental population, 379
Radial neuromuscular system, 474
RAFFERTY, N. S., see S. Zigman, 341
RAFTERY, LAUREL A., see Michele Sanicola, 508
RAINER, JULIA S., see Charlotte P. Mangum, 453
RAINVILLE, CAROL A., see Andrew L. Miller, 325; and Felix Strumwasser, 331
RAJ, L., see D. Morrissey, 506
RAO, A. S. M. KRISHNA, AND R. E. HAUSMAN, Identification of a cDNA encoding the cell recognition molecule, retina cognin, 512
RAUSKOLB, C., see M. Peifer, 507
READ, A. T., J. A. MCTEAGUE, AND C. K. GOVIND, Morphology and behavior of an unusually flexible thoracic limb in the snapping shrimp, *Alpheus heterochelis,* 158
Reduction, 189
Regulation of a *Drosophila* growth factor homolog, *decapentaplegic (dpp)* in imaginal disks, 508
Regulation of *mec-3,* a homeobox-containing gene that controls mechanoreceptor neuronal differentiation in *C. elegans,* 509
Relative contributions of the egg layer and egg cordon to pheromonal attraction and the induction of mating and egg-laying behavior in *Aplysia,* 71
Reproduction, 216, 232, 402
Reproductive
  behavior,81
  ecology, 387
  success, 261
Reproductive ecology of an intertidal brachyuran crab, *Sesarma* sp. (nr. *reticulatum*), from the Gulf of Mexico, 387
Response of oceanic mixed layer depth to physical forcing: modelled vs. observed, The, 360
Responses of a rocky shore gastropod to the effluents of predatory and non-predatory crabs: avoidance and attraction, 363
Responses of horizontal semicircular canal afferents to rotary and mechanical stimulation, 319
Resting eggs, 269
Restriction fragment length polymorphism analysis reveals high levels of genetic divergence among the light organ symbionts of flashlight fish, 135
Retina, 323
Retina cognin mediates cholinergic differentiation in the embryonic chick retina, 512
Reversible epithelial adhesion closes the mouth of *Beroë,* a carnivorous marine jelly, 463
RIGGLEMAN, B., see M. Peifer, 507
RIPPS, HARRIS, see Robert Paul Malchow, 323
ROGINA, BLANKA, CAROLINE N. D. COELHO, ROBERT A. KOSHER, AND WILLIAM B. UPHOLT, Cloning of the chicken homologs of the human homeobox-containing genes Hox-4F and 11 and analysis of their expression during chick limb development, 512
Role of *Drosophila* gene *armadillo* in cell interactions and *wingless* signaling, The, 507
Role of olfaction in courtship behavior of the American lobster, *Homarus americanus,* The, 402
Role of olfaction in recognition of dominance in the American lobster (*Homarus americanus*), 359
ROMAN, G., see J. Kieber, 507
ROSENKRANZ, MARGALIT, JONG S. LIM, KRYSTYNA FRENKEL, AND WALTER TROLL, Effect of hydrogen peroxide on preventing or contributing to polyspermic fertilization in sea urchin: modification by tamoxifen and macroglobulin, 346

S

SAGAR, G. D. VIVEK, AND R. E. HAUSMAN, Retina cognin mediates cholinergic differentiation in the embryonic chick retina, 512
SAGI, A., see Z. Ra'anan, 379
SALTER-CID, LUISA, AND CHARLES H. BIGGER, Alloimmunity in the gorgonian coral *Swiftia exserta,* 127
SANGER, RICHARD H., see Dawn M. Cishek, 342
SANICOLA, MICHELE, LAUREL A. RAFTERY, RONALD K. BLACKMAN, AND W. M. GELBART, Regulation of a *Drosophila* growth factor homolog, *decapentaplegic (dpp)* in imaginal disks, 508
SAVAGE, R. M., AND M. V. DANILCHIK, Germ plasm dynamics in *Xenopus* early development, 513
SCEMES, ELIANA, AND JOHN C. MCNAMARA, The ultrastructure of the radial neuromuscular system of the jellyfish *Liriope tetraphylla* (Hydrozoa, Trachymedusae): implications in crumpling behavior, 474
SCHAD, GERHARD A., see Bryan Cherry, 358
SCHLEMERMEYER, ETHA, AND RICHARD L. CHAPPELL, Serotonin-like immunoreactivity reveals evidence for centrifugal fibers and a distinctive class of amacrine cell in the skate retina, 327
SCHOETER, SALLY, AND MILTON P. CHARLTON, Distribution of synaptic specialization in the frog cardiac ganglion, 328
Sclerite function, 275
SCPb, 484
Sea urchin Endo 16 mRNA is potentially differentially processed, and its expression is sensitive to lithium chloride, 513
Second messengers, 329
SEGAL, SHELDON J., see Hiroshi Ueno, 347
SEITZ, ANNA W., see Rui Yan, 514
Self-organization, 484

Semicircular canal, 319
Sensory biology, 408
Serotonin, 175, 327
Serotonin-like immunoreactivity reveals evidence for centrifugal fibers and a distinctive class of amacrine cell in the skate retina, 327
Serotonins, 484
Sesarma, 387
Settlement, 104
SEWELL, MARY A., see Don R. Levitan, 371
Sex change, 199
SHIMOMURA, OSAMU, see Andrew L. Miller, 325
SHUMWAY, SANDRA E., see Louis F. Gainey, Jr., 298
SIEBERS, DIETRICH, TARIG MUSTAFA, AND KIRSTEN BÖTTCHER, Effects of indomethacin on active ion transport across the gills of the shore crab, *Carcinus maenas,* 312
Signal, 104
Signal integration, 332
SILVER, ROBERT B., see R. Llinas, 316
SILVERMAN, H., see D. B. Gardiner, 175
SINGH, HARLEEN, MARCELLO CURTO, AJIT ALLES, AND ZAHRA ZAKERI, Modulation of programmed cell death and gene expression in mouse limb development, 513
Skate, 323
Skate retina, 327
SKINNER, DOROTHY M., see Jack J. O'Brien, 427
SMITH, PETER J., see Andrew L. Miller, 325
Snapping shrimp, 158
Social control of sex change in the bluehead wrasse, *Thalassoma bifasciatum* (Pisces: Labridae), 199
Social organization, 379
SOINILA, SEPPO, AND GEORGE J. MPITSOS, Immunohistochemistry of diverging and converging neurotransmitter systems in mollusks, 484
SOLL, DAVID, see David Knecht, 510
SOLTYSIK-ESPAÑOLA, MARGARET, CATHERINE NOCENTE-MCGRATH, ROBERT MCISAAC, AND SUSAN G. ERNST, Sea urchin Endo 16 mRNA is potentially differentially processed, and its expression is sensitive to lithium chloride, 513
Spatial information in the three-dimensional fine structure of an aquatic odor plume, 408
Spawning, 232, 261
Speman, Hans, 72
Sperm motility, 347
Spermatophore diversity within and among the hermit crab families, Coenobitidae, Diogenidae, and Paguridae (Paguroidea, Anomura, Decapoda), 238
Spermatophores, 238
Sponge sulfate restriction, 337
SPRUSTON, NELSON, AND MICHAEL NUSBAUM, Cyclic nucleotide-mediated modulation of the pyloric motor pattern in the stomatogastric ganglion of the crab *Cancer borealis,* 329
Starfish embryo, 95
STAVES, MARK, see Randy Wayne, 508
STEMMER, ANDREAS, see Shinya Inoué, 336
STEPHENS, R. E., AND G. PRIOR, Tektins from *Spisula solidissima* cilia, 339
Strombidium, 500
Stronglyocentrotus franciscanus, 371
STRUMWASSER, FELIX, JOSEPH MCINTYRE, AND CAROL A. RAINVILLE, Long-term monitoring of Ca^+ in cultured *Aplysia* neurons with fluorescent probes, 331
STRUMWASSER, FELIX, see Andrew L. Miller, 325; Jacalyn Vogel, 340; and Rachel L. Cox, 333
SUGIMORI, M., see R. Llinas, 316
Sulfated Polysaccharide, 104
Suspension feeding, 442
SVOBODA, KATHY K. H., Application of confocal laser scanning microscopy for spatial localization of actin, endoplasmic reticulum, and collagen mRNA in embryonic *Avian* corneel epithelia, 513
SWEARER, STEPHEN E., see Robert R. Warner, 199
Symbiosis, 135
Synapse, 320, 474
Synaptic background activity influences spatiotemporal integration of single pyramidal cells, 317

T

TAMM, SIDNEY L., AND SIGNHILD TAMM, How *Beroë* keeps its mouth shut, or its lips are sealed, 354
TAMM, SIDNEY L., AND SIGNHILD TAMM, Reversible epithelial adhesion closes the mouth of *Beroë,* a carnivorous marine jelly, 463
TAMM, SIDNEY, see Michael Deiner, 335, and Signhild Tamm, 355
TAMM, SIGNHILD, AND SIDNEY TAMM, Macrociliary tooth patterns in beroid ctenophores, 355
TAMM, SIGNHILD, see Sidney L. Tamm, 354, 463
Tamoxifen, 346
Teeth, 355
Tektins from *Spisula solidissima* cilia, 339
Tettraphyllidean life cycle, 358
Thalassoma bifasciatum, 199
THEILACKER, GAIL H., see Mark D. Ohman, 500
THIRIOT-QUIÉVREUX, CATHERINE, see Diarmaid O'Foighil, 222
Threshold, 419
Tidal and seasonal patterns in the chondrophore of the soft-shell clam *Mya arenaria,* 307
Tigriopus californicus, 123
Tissue adhesion, 354
Tissue culture decontamination, 175
Towards the development of a technique for introducing aequorin into amoebae of *Dictyostelium discoideum* via electroporation, 342
Transmitter release, 320
TROLL, WALTER, see Margalit Rosenkranz, 346
TUDGE, CHRISTOPHER C., Spermatophore diversity within and among the hermit crab families, Coenobitidae, Diogenidae, and Paguridae (Paguroidea, Anomura, Decapoda), 238
Turbulent despersion, 408
TURNER, F. S., see D. B. Gardiner, 175

U

Uca, 205
UENO, HIROSHI, TATSUJI HANEJI, YUMIKO UENO, SAMUEL S. KOIDE, AND SHELDON J. SEGAL, Evaluation of spermatocidal activity of water soluble gossypol on the sperms of *Arabacia punctulata* and *Spisula solidissima,* 347
UENO, YUMIKO, see Hiroshi Ueno, 347
Ultrastructure, 144, 474
Ultrastructure of the radial neuromuscular system of the jellyfish *Liriope tetraphylla* (Hydrozoa, Trachymedusae): implications in crumpling behavior, The, 474
Ultraviolet light from the nighttime sky enhances retinal sensitivity of *Limulus,* 321
Unionid gills, 175
UPHOLT, WILLIAM B., see Blanka Rogina, 512; and Caroline N. D. Coelho, 510
Use of PCR to identify novel mouse homeobox regions expressed during F9 embryoid body formation, The, 511
UV-induced damage, 341

V

Vanadate, 189
Vanadobin, a vanadium-binding substance, extracted from the blood cells of an ascidian, can reduce vanadate (V) to vanadyl (IV), 189
Vanadyl, 189
Vargula, 181
Variation in fertilization rate in the tropical reef fish, *Halichoeres bivattatus:* correlates and implications, 232
Vegetal pole, 343
Vestibular, 319
Video microscopy, 336
VIP, 484

VOGEL, JACALYN, AND FELIX STRUMWASSER, Identification of unique proteins in the eye of *Aplysia californica*, a circadian organ, 340
Voltage- and ligand-gated conductances of bipolar cells from the skate retina, 323
Voltage-dependent -L-type Ca^{2+} channels VDCCs participate in regulating neural crest development, 506

W

VON WALLIS, E., see J. C. Lewis, 275
WALLACE, HEATHER V., see Robert M. Cerrato, 307
WANG, RUI, LINGYUN WU, ANDREW L. MILLER, JOHN M. ARNOLD, AND LIONEL F. JAFFE, KCl-induced calcium rise in squid eggs: measurement of fura-2 fluorescence, 348
WARGO, ROBERT N., see Bruce J. Barber, 216
WARNER, ROBERT R., AND STEPHEN E. SWEARER, Social control of sex change in the bluehead wrasse, *Thalassoma bifasciatum* (Pisces: Labridae), 199
WAX, Y., see Z. Ra'anan, 379
WAY, JEFFREY C., Regulation of *mec-3*, a homeobox-containing gene that controls mechanoreceptor neuronal differentiation in *C. elegans*, 509
WAYNE, RANDY, MARK STAVES, AND A. CARL LEOPOLD, The effect of gravity on cytoplasmic streaming in characean cells, 508
WEIR, M., see D. Morrissey, 506; and Patricia A. Labosky, 511
WEISSBURG, MARC J., AND RICHARD K. ZIMMER-FAUST, Ontogeny *versus* phylogeny in determining patterns of chemoreception: initial studies with fiddler crabs, 205
WELLER, R. A., see M. M. O'Brien, 360
WESSELS, DEB, see David Knecht, 510
Western Atlantic, 195
WHARTON, KRISTI, AND WILLIAM GELBART, Identification in *Drosophila* of a new member of the TGF-β superfamily of cell signalling molecules, 508
WHEELER, R. B., JR., see S. Zigman, 341
WIESCHAUS, E., see M. Peifer, 507
WOLFE, CONNIE J., AND MARGO G. HAYGOOD, Restriction fragment length polymorphism analysis reveals high levels of genetic divergence among the light organ symbionts of flashlight fish, 135
WOLLENBERG, A., see J. Kieber, 507
Women in science (biology), 72
WONG, MARY A., see Sherry D. Painter, 81
WOODRUFF, RICHARD I., ANDREW L. MILLER, AND LIONEL F. JAFFE, Differences in free calcium concentration between oocytes and nurse cells revealed by corrected aequorin luminescence, 349
WU, LINGYUN, see Rui Wang, 348

Y

YAJIMA, SATOSHI, see Susumu Ikegami, 95
YAN, RUI, AND ANNA W. SEITZ, Construction of preimplantation mouse on cDNA library by polymerase chain reaction, 514
YEE, GENE H., see Susan B. Zusman, 507
YUEH, YIR G., see Richard C. Crain, 507

Z

ZAKERI, ZAHRA, see Harleen Singh, 513
ZECEVIC, DEJAN, Optical recording of membrane potential changes from single neurons using intracellular voltage-sensitive dyes, 332
ZIGMAN, S., N. S. RAFFERTY, AND R. B. WHEELER, JR., Effects of vitamin E and OH-TEMPO (Spin Label Trap) on UV-induced dogfish (*Mustelus canis*) lens opacification relative to cytoskeletal actin, 341
ZIMMER-FAUST, RICHARD K., Chemical signal-to-noise detection by spiny lobsters, 419
ZIMMER-FAUST, RICHARD K., see Marc J. Weissburg, 205
ZIMMERMAN, TODD L., AND DARRYL L. FELDER, Reproductive ecology of an intertidal brachyuran crab, *Sesarma* sp. (nr. *reticulatum*), from the Gulf of Mexico, 387
Zooplankton, 500
ZUSMAN, SUSAN B., YEVGENYA GRINBLAT, GENE H. YEE, FOTIS KAFATOS, AND RICHARD O. HYNES, A dissection of the functions of PS integrins during *Drosophila* development, 507